

REMARKS

Pending in the application are claims 1-20, of which claims 1, 8 and 15 are independent. The following comments address all stated grounds for rejection and place the presently pending claims, as identified above, in condition for allowance.

35 U.S.C. §102 Rejections

Applicants thank the Examiner for the close review of the claims, and for indicating that claims 4, 11 and 18 recite patentable subject matter. Applicants also appreciate the withdrawal of the previous rejection of claims 1-20 under 35 U.S.C. §102(b) and (e) as being unpatentable over the Czimmek reference, the Yanai reference and/or the Wright reference. In the current Office Action, the Examiner rejects claims 1-3, 5-10, 12-17 and 19-20 under 35 U.S.C. §102(e) as being anticipated by the Boie et al. reference (U.S. Patent Number 6,340,008). Applicants traverse the rejections, and submit that the presently pending claims are patentable over the cited Boie reference, because the Boie reference does not teach or suggest applying a brake to an armature in an electromagnetic actuator according to a load condition of the armature, as recited in independent claims 1, 8 and 15.

The Boie reference describes a method of controlling an electromagnetic actuator used for activating a valve, the valve having two electromagnets, an armature movable between the electromagnets and at least one return spring for biasing the armature in a selected position. To activate the valve, currents are alternatively supplied to the electromagnets, causing the armature to move from a releasing electromagnet to a capturing electromagnet. When the armature reaches a target window within a predetermined spacing range from the capturing electromagnet, the supply of current to the capturing electromagnet is controlled to minimize the speed at which the armature approaches the capturing electromagnet. The current supply to the capturing electromagnet is controlled based on measurements taken in two prior stages while the armature travels from the releasing electromagnet to the target window.

According to the Examiner, the Boie reference anticipates the claims because the Boie

reference describes an electromagnetic actuator including an engine control unit that controls valve operation based on load, rpm, temperature and other parameters. The Examiner also considers the Boie reference to teach application of a current and a voltage during a first period, beginning at the start of the release of the armature, to influence the initial speed of the armature.

Applicants respectfully disagree and submit that the Boie reference does not teach or suggest applying a brake to an armature *according to* a load condition of an *armature*, as recited in independent claims 1, 8 and 15. While the Boie reference describes a current regulator that supplies current to the electromagnets of an actuator based on operating data supplied to an engine control unit, including the load requirement of the corresponding engine, the Boie reference does not teach or suggest applying a *brake* based on a load condition of the armature. Rather, the load requirement of the engine, in addition to other parameters, is used only to determine when to release the actuator from the retaining electromagnet. The load on the engine in no way controls or influences the application of a brake to an armature in the electromagnetic actuator of Boie. In contrast, the present invention determines what *type* of braking operation should be applied to the armature based on a load condition of the armature.

The Boie reference also does not teach or suggest applying a brake to an armature *in response to* a release of the armature from an electromagnet, as also recited in independent claims 1, 8 and 15. Rather, when the armature of Boie is released from the retaining electromagnet, “the armature movement is only ‘observed’” (see column 2, lines 66-67) and no brake is applied.

In fact, the Boie reference teaches *away* from applying a brake “in response to a release of the armature” as set forth in claims 1, 8 and 15. For example, in column 3, lines 13-20, the Boie reference states that “[a]s soon as the armature has perceptibly detached from the pole face of the previous retaining electromagnet it is ***no longer possible to influence the armature***, either through a corresponding supply of current to the previous retaining electromagnet or through a premature supply of current to the capturing electromagnet...” [emphasis added]. Therefore, Boie teaches that no braking force or other influencing force

can be applied to an armature immediately after release of the armature from an electromagnet, in contrast to the claimed invention.

The Boie reference further teaches away from applying a brake in response to a release of the armature in column 6, lines 38-51, by specifying that the initial speed of the armature can be *increased* by repelling the armature away from the releasing electromagnet. This has the opposite effect of a brake, which *constrains* the motion of the armature after release.

While Boie suggests that a brake may be applied to an armature by inverting a voltage applied to a capturing armature, this brake is only applied when and if the armature approaches “the target window too rapidly” (see column 4, lines 28-38), and not in response to a release of the armature, or according to a load condition of an armature, as required by independent claims 1, 8 and 15.

In addition, the Boie reference clearly does not teach the subject matter of dependent claims 2, 9 and 16, which recite that a brake is applied to an armature by applying a voltage to an electromagnet corresponding to the end position from which the armature is released. The Boie reference only describes manipulating the current supplied to the *receiving* electromagnet, or applying a counterfield to the *receiving* electromagnet as the armature approaches the target window, but does not teach or suggest applying a braking force to a releasing electromagnet.

For at least these reasons, pending claims 1-20 distinguish patentably over the cited Boie reference. As such, Applicants respectfully request that the rejection of claims 1-3, 5-10, 12-17, 19 and 20 under 35 U.S.C. §102(e) be reconsidered and withdrawn.

CONCLUSION

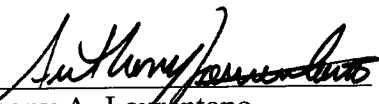
In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

If, however, the Examiner considers that obstacles to allowance of these claims persist, we invite a telephone call to Applicants' representative at the number listed below.

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 12-0080, under Order No. OAC-018 from which the undersigned is authorized to draw.

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Respectfully submitted,

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